

Patent Claims

1. Method for controlling a vehicle, in particular a traction-slip control system (TCS), **characterized in that** a diagonal axle twist is detected and evaluated as a regulating variable.
2. Method according to Claim 1, **characterized in that**, following the detection of a diagonal axle twist, the effect of a partial or complete lock of a center, front-axle and/or rear-axle differential is achieved with means of the vehicle control system and/or that a center, front-axle and/or rear-axle differential is locked partially or completely with the help of a differential lock, if such is available.
3. Method according to Claim 1 or 2, **characterized in that**, following the detection of a diagonal axle twist, a medium brake pressure level is set at the wheel brakes of the controlled wheels with a minimum traction slip, corresponding to the required traction, and maintained for a certain period of time.
4. Method according to one of the Claims 1 to 3, **characterized in that**, following the detection of a diagonal axle twist, the control threshold of the traction-slip control system is additionally reduced.
5. Method according to one of the Claim 1 to 4, **characterized in that** the detected diagonal axle twist is evaluated as a regulating variable and/or a corresponding control function of the vehicle control system is only activated when the vehicle speed, in particular a calculated or estimated vehicle reference speed, falls below a specified vehicle speed limit value, preferably within the range of 3 to 15 km/h.

6. Method for detecting a diagonal axle twist of a motor vehicle with all-wheel drive and a vehicle control system, in particular a traction-slip control system system, **characterized in that** the diagonal axle twist is determined on the basis of the wheel slip, the rotating behavior and/or changes in rotating behavior of the individual, driven wheels.
7. Method for detecting a diagonal axle twist according to Claim 6, **characterized in that** the rotating behavior of the individual, driven wheels is measured and evaluated to determine the traction slip and other regulating variables and that a diagonal axle twist is determined on the basis of a traction slip of the individual wheels that is greater than a specified limit value.
8. Method according to Claim 6 or 7, **characterized in that** a diagonal axle twist is determined on the basis of the rotating behavior and/or changes in rotating behavior of at least two transversally opposite wheels as well as two diagonally opposite pairs of wheels respectively.
9. Method according to Claim 7 or 8, **characterized in that** a diagonal axle twist is determined when certain traction-slip conditions are satisfied for a certain period of time.
10. Method according to Claim 9, **characterized in that** a diagonal axle twist is detected when the following conditions are satisfied for a predefined period of time:
 - a) a traction slip greater than a specified limit value prevails only on one wheel of the secondary axle;

- b) a traction slip greater than the specified limit value prevails on both of two diagonally opposite wheels of a pair of wheels, and
- c) a traction slip less than the specified limit value prevails on a first wheel of the primary axle, with such first wheel lying opposite a second wheel of the primary axle with a traction slip greater than the specified limit value or that at least a low brake pressure, compared to the second wheel of the primary axle with a traction slip greater than the specified limit value, is given in the wheel brake of the first wheel of the primary axle, with such first wheel lying opposite the second wheel of the primary axle with a traction slip greater than the specified limit value.

- 11. Method according to Claim 10, **characterized in that** the state of a diagonal axle twist is determined when conditions a) to c) are satisfied for a period of time of 0.3 to 1.5 sec.
- 12. Method according to one of the Claims 9 to 11, **characterized in that**, a diagonal axle twist is determined when the specified traction-slip conditions are satisfied for a relatively short period of time, preferably 50 to 200 msec., and if the last previous diagonal axle twist was determined just a few seconds before, preferably 5 to 15 sec.
- 13. Method according to one of the Claims 8 to 12, **characterized in that** a traction slip, related to the wheel rotation speed of the spinning wheel, is specified as the traction-slip limit value within a range of 10 km/h to 40' km/h.
- 14. Method according to one of the Claims 8 to 13, **characterized in that** the traction-slip limit value on a

wheel is considered to have been exceeded when a control procedure of the traction-slip control system is activated or continued at the respective wheel.

15. Method for controlling a motor vehicle, in particular a traction-slip control system (TCS), characterized in that the diagonal axle twist is detected with the help of a method according to one of the Claims 6 to 14.

16. Circuit arrangement for detecting a diagonal axle twist of a motor vehicle with all-wheel drive and a traction-slip control system, with such motor vehicle exhibiting a detection circuit for detecting measured changes in rotating behavior of the driven wheels, characterized in that the circuit arrangement exhibits a first detection circuit (40) for detecting a diagonal axle twist of the motor vehicle on the basis of the changes in rotating behavior of the driven wheels detected by the detection circuit (54).

17. Circuit arrangement according to Claim 16, characterized in that the first detection circuit (40) exhibits a first evaluating circuit (41) for evaluating a slip of the wheels on the secondary axle, that the first detection circuit (40) exhibits a second and third evaluation circuit (42, 43) for evaluating a slip of the wheels of the two diagonally opposite pairs of wheels respectively, that the first detection circuit (40) exhibits a fourth evaluation circuit (44) for evaluating a slip of the wheels on the primary axle and that the first detection circuit (40) exhibits an integrator (55) and a signal generator (56) for generating a signal when slip conditions typical for a diagonal axle twist were detected over a certain period of time with the help of the evaluation of the first, second, third and fourth evaluating circuits (41, 42, 43, 44).

18. Circuit arrangement according to Claim 16 or 17,
characterized in that a second detection circuit (60) is
associated with the first detection circuit (40) for
detecting a vehicle reference speed on the basis of
measured values and that the first detection circuit (40)
exhibits a comparator (61) for comparing the determined
vehicle reference speed with a specified limit value, with
the first detection circuit (40) generating a signal
indicating a diagonal axle twist only if the determined
vehicle reference speed falls below the specified value.